

Bird species diversity in five protected areas of Bangladesh

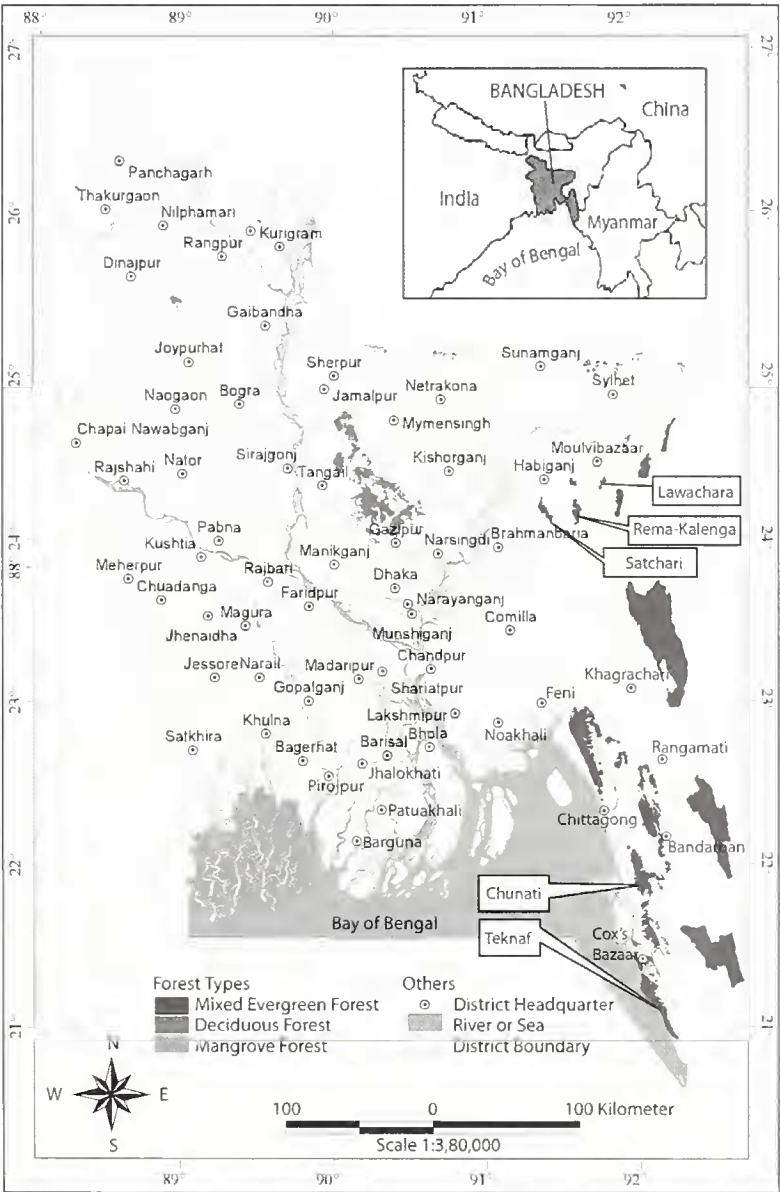
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Birds of five protected areas (Lawachara, Satchari, Rema-Kalenga, Chunati and Teknaf) in north-east and south-east Bangladesh were studied during 2005–2008 by strip transect sampling and opportunistic surveys. Of 239 species of birds recorded, 189 were residents, 39 winter visitors, 6 summer visitors and 5 vagrants; 40 (17%) were ‘Very Common’, 66 (28%) ‘Common’, 48 (20%) ‘Fairly Common’ and 85 (35%) ‘Uncommon’. Population densities of eight species, selected as indicators of forest condition, were estimated; two understorey species, Red Junglefowl *Gallus gallus* and Puff-throated Babbler *Pellorneum ruficeps*, increased in the study period, perhaps owing to understorey regeneration increasing the carrying capacity and nesting sites, plus (for the junglefowl) reduced hunting pressure. However, illegal logging of timber trees continues in some areas, probably causing the decline of Oriental Pied Hornbill *Anthraceroceros albirostris*. Densities of the other five indicators (Red-headed Trogon *Harpactes erythrocephalus*, Greater Racket-tailed Drongo *Dicrurus paradiseus*, White-rumped Shama *Copsychus malabaricus*, Hill Myna *Gracula religiosa* and White-crested Laughingthrush *Garrulax leucolophus*) remained more or less unchanged.

INTRODUCTION

Bangladesh has a network of protected areas under the jurisdiction of the Forest Department, but very little information is available on the birds of these areas. Moreover, there had been no attempt to use birds as indicators of ecological change in the protected areas, although birds are one of the best indicators of such change (Morrison 1986, Temple & Wiens 1989, Browder *et al.* 2002).

Figure 1. Forested areas of Bangladesh showing the locations of five NSP (Nishorgo Support Project) sites where the survey was conducted.



Different species of bird occur in different vertical strata of an area and are adapted to specific types of plant and animal food. Therefore, avian population density and species diversity reflect the changes in their habitat conditions, and indicate the health of different vertical strata of the forest. Determining the extent of change in ecological systems is critical to the long-term conservation of biotic diversity (Canterbury *et al.* 2000).

In its 147,570 km² Bangladesh harbours nearly 700 species of bird, which is 50% of the total of the Indian subcontinent and 7% of the world's total (Harvey 1990, Khan 2008). However, the natural forests and other wilderness areas of the country are under great pressure from legal and illegal overexploitation, together with improper management. Forest cover has been reduced by more than 50% since the 1970s (IUCN-Bangladesh 2000). Bangladesh has less than 0.02 ha of forest land per person—one of the lowest forest-to-population ratios in the world (IUCN-Bangladesh 2000). The urgent need to conserve the remaining tracts and their inhabitants,

Table 1. Strip transect locations in five NSP sites where the bird survey was conducted.

Name of project site	Transect location	Geographic locations of transect ends	Transect length (km)
Lawachara National Park (area: 1,250 ha; year of establishment: 1996)	Eastern	24°19.9'N 91°47.6'E; 24°20.2'N 91°47.5'E	0.50
	Central	24°19.7'N 91°47.2'E; 24°19.8'N 91°47.5'E	0.61
	Central	24°19.8'N 91°47.2'E; 24°20.2'N 91°47.2'E	0.50
	Central	24°19.5'N 91°47.2'E; 24°19.7'N 91°47.6'E	0.70
	Western	24°19.2'N 91°47.1'E; 24°19.4'N 91°46.8'E	0.52
	Western	24°18.8'N 91°46.4'E; 24°19.1'N 91°46.9'E	0.89
Satchari National Park (area: 243 ha; year of establishment: 2006)	Central	24°07.5'N 91°26.7'E; 24°06.6'N 91°27.2'E	1.94
	Central	24°07.6'N 91°27.0'E; 24°07.3'N 91°27.2'E	0.56
	Northern	24°07.4'N 91°26.7'E; 24°07.5'N 91°27.0'E	0.50
Rema-Kalenga Wildlife Sanctuary (area: 1,795 ha; year of establishment: 1996)	Northern	24°10.7'N 91°37.6'E; 24°09.6'N 91°38.0'E	2.02
	Central	24°09.6'N 91°38.0'E; 24°09.8'N 91°37.5'E	0.78
	Northern	24°10.2'N 91°37.5'E; 24°10.3'N 91°37.9'E	0.80
	Southern	24°06.9'N 91°37.5'E; 24°06.4'N 91°37.8'E	1.11
Chunati Wildlife Sanctuary (area: 7,764 ha; year of establishment: 1986)	Eastern	21°55.4'N 92°03.5'E; 21°55.3'N 92°02.7'E	1.41
	Central	21°55.3'N 92°02.7'E; 21°55.5'N 92°02.3'E	0.76
	Eastern	21°55.7'N 92°02.5'E; 21°56.1'N 92°03.5'E	1.91
	Northern	21°57.3'N 92°04.1'E; 21°57.2'N 92°03.7'E	0.65
	Northern	21°57.2'N 92°03.7'E; 21°57.4'N 92°04.0'E	0.65
Teknaf Game Reserve (area: 11,615 ha; year of establishment: 1983)	Northern	21°05.8'N 92°09.8'E; 21°05.2'N 92°10.2'E	1.25
	Northern	21°05.2'N 92°10.2'E; 21°05.4'N 92°09.5'E	1.27
	Northern	21°06.3'N 92°11.7'E; 21°05.5'N 92°10.8'E	0.74
	Central	21°05.2'N 92°11.9'E; 21°03.9'N 92°11.6'E	2.49
	Central	21°03.9'N 92°11.6'E; 21°04.5'N 92°11.9'E	1.21

while simultaneously developing non-consumptive uses, gave rise to the Forest Department’s five-year Nishorgo Support Project (NSP), which was implemented by the International Resources Group (IRG) of Washington DC, together with its local partners.

The work reported here was supported by NSP, which used the results as a tool to understand the impact of newly introduced co-management on five protected areas. In our survey, the temporal changes of population densities of eight indicator species of bird were studied so that the ecological health of five protected areas could better be monitored. All species of bird were recorded, together with their relative abundance. The study was conducted on a participatory basis, involving birdwatchers, local communities and Forest Department officials in order that everybody would become aware of what is happening to the birds in these sites.

There are 28 protected areas in Bangladesh with a total area of 8,718.87 km², covering only 5.9% of the total area of Bangladesh. All the five protected areas (Lawachara, Satchari, Rema-Kalenga, Chunati and Teknaf; Fig. 1, Table 1) where the bird survey was conducted are mainly covered by mixed evergreen forests, but the areas also have some bushy and bamboo-covered areas.

METHODS

Survey methods were selected on the basis of simplicity and effectiveness so that local stakeholders, including people with little or no education, could participate. Strip transect sampling (Buckland *et al.* 2001) and opportunistic survey methods were selected. The survey was conducted in the breeding season (February–August), so that there would be more bird activity. The baseline survey was conducted in 2005, and was repeated in 2006, 2007 and 2008, in the same season and following the same transects, so that the results could be compared across different years.

Strip transect sampling was found most suitable to estimate the population densities of eight indicator species of bird (see below for choice rationale). In this method the observers slowly walked (c.1.5 km/hr) in relatively straight lines through the study areas and counted the indicator birds from both sides. The observation-range on each side (half-width of the strip) was 20 m, which was found suitable in terms of visibility. Thus the strip width was 40 m. The initial location of the bird was recorded. The observation-range was measured by an infrared rangefinder (Bushnell Yardage Pro). Any bird sighted beyond the pre-decided observation-range or coming from behind the observer was not counted. The survey was conducted in early mornings and late afternoons when the birds were most active. This method assumes that all birds in the strip are recorded. Transects were located mainly in the rich parts of the protected areas where the bird habitats were least disturbed. Depending on reserve size, the total lengths of transects in each site varied from 3.00 to 6.96 km (Table 1), but transects were periodically repeated 12–15 times per year.

The eight indicator species of bird, suggested at a meeting of experts organised in IRG, Dhaka, were: Red Junglefowl *Gallus gallus*, Oriental Pied Hornbill *Anthracoceros albirostris*, Red-headed Trogon *Harpactes erythrocephalus*, Greater Racket-tailed Drongo *Dicrurus paradiseus*, White-rumped Shama *Copsychus malabaricus*, Hill Myna *Gracula religiosa*, White-crested Laughingthrush *Garrulax leucolophus* and Puff-throated Babbler *Pellorneum ruficeps*. They were selected because: (1) they are primarily forest birds; (2) they live in different vertical strata of the forest (junglefowl, laughingthrush and babbler in lower stratum; trogon, drongo and shama in middle stratum; and hornbill and myna in upper stratum); (3) they are noisy (and thus less likely to be missed during counts); and (4) they are breeding residents. It was assumed that the improvement or degradation of the forest condition would have a direct impact on the feeding and breeding of these species,

which in turn would show changes in population densities (Morrison 1986, Temple & Wiens 1989, Canterbury *et al.* 2000, Browder *et al.* 2002, Lammertink *et al.* 2009).

Any important or interesting observation or information relating to diet, foraging guild and threats was recorded opportunistically at any time in the field. The birds were identified from Ali & Ripley (1987), Grimmett *et al.* (1998) and Rasmussen & Anderton (2005). Relative abundance was assessed by classifying sighting frequencies into four: ‘Very Common’—recorded on 76–100% observation-days, ‘Common’—recorded on 51–75% observation-days, ‘Fairly Common’—recorded on 26–50% observation-days, and ‘Uncommon’—recorded on 25% or fewer observation-days.

RESULTS

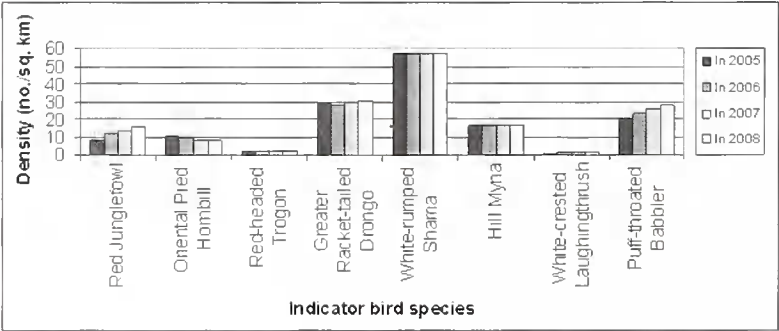
During the avian breeding season (February–August) of four consecutive years (2005–2008), 239 species of bird were recorded in the five protected areas, of which 189 were residents, 39 winter visitors, 6 summer visitors and 5 vagrants (see Appendix). The relative abundance shows that 40 (17%) species were ‘Very Common’, 66 (28%) ‘Common’, 48 (20%) ‘Fairly Common’ and 85 (35%) ‘Uncommon’. Based on principal diet 131 (55%) species were insectivorous, 32 (13%) carnivorous, 29 (12%) omnivorous, 23 (10%) granivorous and herbivorous, 17 (7%) frugivorous, and 7 (3%) nectarivorous. Based on principal foraging guild 100 (42%) species were middle-canopy foragers, 78 (33%) ground foragers, 36 (15%) upper-canopy foragers, and 25 (10%) undergrowth and bush foragers.

The site lists show that the total number of species and the total number of primarily forest species for Lawachara were, respectively, 167 and 90 (54%), Satchari 153 and 84 (55%), Rema-Kalenga 206 and 91 (44%), Chunati 162 and 53 (33%), and Teknaf 188 and 73 (39%). The percentages indicate how the ratio of total species to total forest species varied across the five sites.

Annual mean density estimates from 2005 to 2008 revealed that two understorey indicator species (Red Junglefowl and Puff-throated Babbler) increased at every site and at all sites combined (Fig. 2). Oriental Pied Hornbill declined and the other five indicator species remained more or less unchanged (Fig. 2).

Three species of global conservation concern were recorded: White-rumped Vulture *Gyps bengalensis* (Critically Endangered; nesting colony found in Rema-Kalenga), Lesser Adjutant *Leptoptilos javanicus* (Vulnerable; one adult in Rema-Kalenga, 10 March 2008) and White-cheeked Partridge *Arborophila atrogularis* (Near Threatened; parent and hatchling in Lawachara, 15 March 2008). Eleven nationally threatened species (according to IUCN-Bangladesh 2000; since the list is out of date the White-rumped Vulture is not included) were recorded: Kalij Pheasant *Lophura leucomelanos*, Grey Peacock Pheasant *Polyplectron bicalcaratum*, Oriental Pied Hornbill, Red-headed Trogon, Dollarbird *Eurystomus orientalis*, Spot-bellied Eagle Owl *Bubo nipalensis*,

Figure 2. Comparison of the population density of eight indicator bird species across five NSP sites during 2005–2008.



Brown Fish Owl *Ketupa zeylonensis*, Tawny Fish Owl *Ketupa flavipes*, Malayan Night Heron *Gorsachius melanolophus*, Lesser Adjutant and Streaked Spiderhunter *Arachnothera magna*.

DISCUSSION

The total bird species (239) recorded in five NSP sites represents over 30% of the birds recorded in Bangladesh (Khan 2008, Siddiqui *et al.* 2008), and almost 18% recorded in the Indian Subcontinent (Grewal *et al.* 2002). The species were recorded mainly during transects while counting indicator birds, so some may have been missed either because they occurred away from the transects or because of observer inattention. The cryptic nature of some birds might also have contributed to the crudeness of the relative abundance.

An increase in density of two indicator species (Red Junglefowl and Puff-throated Babbler) would suggest that the forest understorey is regenerating and increasing the carrying capacity and nesting sites for these two species. Community patrolling and awareness, and other programmes conducted by NSP has played a key role in reducing understorey firewood exploitation and hunting pressure. However, White-crested Laughingthrush did not respond like the junglefowl and babbler, possibly having different limiting factors; it is a rare species in Bangladesh and was found only in Chunati, which is more open compared to four other NSP sites. Illegal removal of timber trees and forest fruits still persists, and probably caused the decline of the Oriental Pied Hornbill over the four years. This bird lives in the upper canopy and suffers severely if large trees are removed from the forest.

Habitat loss remains the main threat to birds in all five NSP sites. Illegal felling of trees and bamboo, and conversion of natural forests to monoculture plantations and agricultural fields, were witnessed during the survey. Hunting and trapping of birds, together with the taking of nestlings as cagebirds (particularly mynas, parakeets and hornbills), is another threat. Large-scale illegal harvest of forest fruits, particularly *Artocarpus chaplasha* and *Bixa* sp., is a growing threat for frugivorous birds. Moreover, the number of visitors in Lawachara and Satchari is becoming excessive. These threats should be reduced in order to maintain a healthy status of birds in the study's five protected areas.

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Appendix

List of bird species recorded in five NSP sites in the breeding season (February–August) during 2005–2008

Distribution: WI – wide (all NSP sites), L – Lawachara, S – Satchari, RK – Rema-Kalenga, C – Chunati, and T – Teknaf. * Primarily forest species.

Species		Principal diet	Principal foraging guild	Status	Distribution
Blue-breasted Quail	<i>Coturnix coturnix</i>	granivore and herbivore	ground	fairly common, resident	C, T, RK
White-cheeked Partridge	<i>Arborophila atricularis</i> *	granivore and herbivore	ground	uncommon (in NSP sites), resident	L, S, RK
Red Junglefowl	<i>Gallus gallus</i> *	granivore and herbivore	ground	common, resident	WI
Kalij Pheasant	<i>Lophura leucamelanos</i> *	granivore and herbivore	ground	fairly common, resident	WI
Grey Peacock Pheasant	<i>Polyplectron bicalcaratum</i> *	granivore and herbivore	ground	uncommon (in NSP sites), resident	T, RK
Lesser Whistling-duck	<i>Dendrocygna javanica</i>	granivore and herbivore	ground	common, resident	T, RK, C
Cotton Pygmy-goose	<i>Nettion carolinensis</i>	granivore and herbivore	ground	uncommon (in NSP sites), resident	T
Barred Buttonquail	<i>Turnix suscitator</i>	granivore and herbivore	ground	fairly common, resident	C, T, RK
Eurasian Wryneck	<i>Jynx torquilla</i>	insectivore	ground	fairly common, winter visitor	C, T, RK
White-browed Piculet	<i>Sitta achroea</i> *	insectivore	middle canopy	uncommon (in NSP sites), resident	S, RK
Rufous Woodpecker	<i>Ceophloeus brachyurus</i>	insectivore	middle canopy	common, resident	WI
Great Slaty Woodpecker	<i>Mulleripicus pulverulentus</i> *	insectivore	upper canopy	uncommon (in NSP sites), resident	T, C
Grey-capped Pygmy Woodpecker	<i>Dendrocopos conicapillus</i> *	insectivore	middle canopy	fairly common, resident	WI
Fulvous-breasted Woodpecker	<i>Dendrocopos macei</i>	insectivore	middle canopy	very common, resident	WI
Lesser Yellownape	<i>Picus chlorolophus</i> *	insectivore	upper canopy	uncommon (in NSP sites), resident	L, C
Greater Yellownape	<i>Picus flavinucha</i> *	insectivore	upper canopy	common, resident	WI
Grey-headed Woodpecker	<i>Picus canus</i>	insectivore	upper canopy	uncommon (in NSP sites), resident	L, S
Black-rumped Flameback	<i>Dinapium benghalense</i>	insectivore	middle canopy	very common, resident	WI
Greater Flameback	<i>Chrysocolaptes lucidus</i> *	insectivore	upper canopy	very common, resident	WI
Lineated Barbet	<i>Megalaima lineata</i>	frugivore	upper canopy	very common, resident	WI
Blue-throated Barbet	<i>Megalaima asiatica</i>	frugivore	upper canopy	very common, resident	WI
Blue-eared Barbet	<i>Megalaima australis</i> *	frugivore	upper canopy	fairly common, resident	L, S, RK, T
Coppersmith Barbet	<i>Megalaima haemacephala</i>	frugivore	middle canopy	very common, resident	WI
Oriental Pied Hornbill	<i>Anthracoceros albirostris</i> *	frugivore	upper canopy	fairly common, resident	L, S, RK, T
Common Hoopoe	<i>Upupa epops</i>	insectivore	ground	common, resident	C, T, RK
Red-headed Trogon	<i>Harpactes erythræcephalus</i> *	insectivore	middle canopy	uncommon (in NSP sites), resident	L, S, RK, T
Indian Roller	<i>Coracias benghalensis</i>	insectivore	ground	common, resident	C, T, RK
Dollarbird	<i>Eurystomus orientalis</i> *	insectivore	upper canopy	uncommon (in NSP sites), vagrant (in Bangladesh)	L, S, RK, T
Common Kingfisher	<i>Alcedo atthis</i>	carnivore (incl. piscivore)	ground (water)	common, resident	WI
Oriental Dwarf Kingfisher	<i>Ceyx erithacus</i> *	carnivore (incl. piscivore)	ground (water)	uncommon (in NSP sites), vagrant (in Bangladesh)	L, S
White-throated Kingfisher	<i>Holcyon smyrnensis</i>	carnivore (incl. piscivore)	ground (water)	common, resident	WI
Pied Kingfisher	<i>Ceryle rudis</i>	carnivore (incl. piscivore)	ground (water)	uncommon (in NSP sites), resident	T
Blue-bearded Bee-eater	<i>Nyctornis athertani</i> *	insectivore	upper canopy	uncommon (in NSP sites), resident	WI
Green Bee-eater	<i>Merops orientalis</i>	insectivore	middle canopy	very common, resident	WI
Blue-tailed Bee-eater	<i>Merops philippinus</i> *	insectivore	upper canopy	common, resident	WI
Chestnut-headed Bee-eater	<i>Merops leschenaulti</i> *	insectivore	upper canopy	very common, resident	WI
Pied Cuckoo	<i>Clomator jacabinus</i>	insectivore	middle canopy	uncommon (in NSP sites), summer visitor	WI
Chestnut-winged Cuckoo	<i>Clomator coromandus</i> *	insectivore	middle canopy	uncommon (in NSP sites), vagrant (in Bangladesh)	L, S, RK
Common Hawk Cuckoo	<i>Hieracoccyx vorius</i>	insectivore	middle canopy	very common, resident	WI
Indian Cuckoo	<i>Cuculus micropterus</i>	insectivore	middle canopy	common, summer visitor	WI
Plaintive Cuckoo	<i>Cacomantis merulinus</i>	insectivore	middle canopy	common, resident	WI
Asian Emerald Cuckoo	<i>Chrysococcyx moluccatus</i> *	insectivore	middle canopy	uncommon (in NSP sites), summer visitor	S
Violet Cuckoo	<i>Chrysococcyx xanthorhynchus</i> *	insectivore	middle canopy	uncommon (in NSP sites), summer visitor	S
Drongo Cuckoo	<i>Surniculus lugubris</i> *	insectivore	upper canopy	common, resident	L, S, RK, T
Asian Koel	<i>Eudynamis scolopacea</i>	insectivore	middle canopy	very common, resident	WI
Green-billed Malkoha	<i>Phaenicaphopus tristis</i> *	insectivore	middle canopy	very common, resident	WI

Species		Principal diet	Principal foraging guild	Status	Distribution
Greater Coucal	<i>Centropus sinensis</i>	insectivore	ground	very common, resident	WI
Lesser Coucal	<i>Centropus bengalensis</i> *	insectivore	upper canopy	common, resident	WI
Vernal Hanging Parrot	<i>Loriculus vernalis</i> *	granivore and herbivore	middle canopy	fairly common, resident	L, S, RK, T
Rose-ringed Parakeet	<i>Psittacula krameri</i>	frugivore	upper canopy	common, resident	WI
Blossom-headed Parakeet	<i>Psittacula roseata</i> *	frugivore	upper canopy	fairly common, resident	L, S, RK
Red-breasted Parakeet	<i>Psittacula olexondri</i> *	frugivore	middle canopy	very common, resident	WI
Asian Palm Swift	<i>Cypsiurus balosiensis</i>	insectivore	upper canopy (mid-air)	common, resident	C, T, RK
Fork-tailed Swift	<i>Apus pocificus</i>	insectivore	upper canopy (mid-air)	uncommon (in NSP sites), winter visitor	T
Oriental Scops Owl	<i>Otus sunio</i> *	insectivore	middle canopy	uncommon (in NSP sites), resident	L, S, RK
Collared Scops Owl	<i>Otus bakkomoeno</i>	insectivore	middle canopy	uncommon (in NSP sites), resident	WI
Spot-bellied Eagle Owl	<i>Buba nipolensis</i> *	carnivore (incl. piscivore)	middle canopy	uncommon (in NSP sites), resident	T
Dusky Eagle Owl	<i>Bubo caramandus</i> *	carnivore (incl. piscivore)	middle canopy	uncommon (in NSP sites), resident	RK
Brown Fish Owl	<i>Ketupa zeylanensis</i>	carnivore (incl. piscivore)	middle canopy	uncommon (in NSP sites), resident	WI
Tawny Fish Owl	<i>Ketupo flovipēs</i> *	carnivore (incl. piscivore)	middle canopy	uncommon (in NSP sites), resident	RK, T
Brown Wood Owl	<i>Strix leptogrommico</i> *	carnivore (incl. piscivore)	middle canopy	uncommon (in NSP sites), resident	L, RK
Asian Barred Owlet	<i>Glucidium cuculoides</i> *	insectivore	middle canopy	common, resident	WI
Spotted Owlet	<i>Athene brama</i>	insectivore	middle canopy	very common, resident	WI
Brown Hawk Owl	<i>Ninox scutuloto</i>	insectivore	middle canopy	common, resident	WI
Large-tailed Nightjar	<i>Coprimulgus mocrurus</i> *	insectivore	middle canopy (mid-air)	common, resident	WI
Rock Pigeon	<i>Calumba livia</i>	granivore and herbivore	ground	common, resident	WI
Green Imperial Pigeon	<i>Duculo oeneo</i> *	frugivore	upper canopy	uncommon (in NSP sites), resident	L, S, RK
Oriental Turtle Dove	<i>Streptopelio orientalis</i> *	granivore and herbivore	middle canopy	uncommon (in NSP sites), resident	L, S, RK
Spotted Dove	<i>Streptopelio chinensis</i>	granivore and herbivore	ground	very common, resident	WI
Red Collared Dove	<i>Streptapelia tranquebarica</i>	granivore and herbivore	ground	common, resident	WI
Eurasian Collared Dove	<i>Streptapelia decaacta</i>	granivore and herbivore	ground	common, resident	WI
Barred Cuckoo Dove	<i>Mocropygio uncholl</i> *	granivore and herbivore	middle canopy	uncommon (in NSP sites), resident	S
Emerald Dove	<i>Chalcaphaps indico</i> *	granivore and herbivore	ground	very common, resident	WI
Orange-breasted Green Pigeon	<i>Treran bicincta</i> *	frugivore	middle canopy	uncommon (in NSP sites), resident	L, S, RK
Pompadour Green Pigeon	<i>Treron pomodoro</i> *	frugivore	middle canopy	common, resident	WI
Thick-billed Green Pigeon	<i>Treron curvirostro</i> *	frugivore	middle canopy	uncommon (in NSP sites), resident	L, S, RK
Yellow-footed Green Pigeon	<i>Treron phoenicoptero</i>	frugivore	middle canopy	common, resident	WI
Wedge-tailed Green Pigeon	<i>Treran sphenura</i> *	frugivore	upper canopy	uncommon (in NSP sites), resident	L, S, RK
White-breasted Waterhen	<i>Amourornis phoenicurus</i>	insectivore	ground	fairly common, resident	RK, C, T
Pintail Snipe	<i>Gollinogo stenuro</i>	insectivore	ground	uncommon (in NSP sites), winter visitor	RK, C, T
Common Snipe	<i>Gollinoga gollinogo</i>	insectivore	ground	uncommon (in NSP sites), winter visitor	RK, C, T
Green Sandpiper	<i>Tringa achrapus</i>	insectivore	ground	uncommon (in NSP sites), winter visitor	RK, C, T
Wood Sandpiper	<i>Tringa glareala</i>	insectivore	ground	common, winter visitor	RK, C, T
Common Sandpiper	<i>Actitis hypoleucos</i>	insectivore	ground	common, winter visitor	RK, C, T
Greater Painted-snipe	<i>Rostrotulo bengholensis</i>	insectivore	ground	fairly common, resident	RK, C, T
Bronze-winged Jacana	<i>Metopidius indicus</i>	granivore and herbivore	ground	fairly common, resident	C
Little Ringed Plover	<i>Charadrius dubius</i>	insectivore	ground	uncommon (in NSP sites), winter visitor	C
Red-wattled Lapwing	<i>Vonellus indicus</i>	insectivore	ground	fairly common, resident	RK, C, T
Little Tern	<i>Sterna albifrans</i>	carnivore (incl. piscivore)	ground (water)	fairly common, resident	T
Whiskered Tern	<i>Chlidonios hybridus</i>	carnivore (incl. piscivore)	ground (water)	fairly common, winter visitor	T
Osprey	<i>Pondion holioetus</i>	carnivore (incl. piscivore)	ground (water)	uncommon (in NSP sites), winter visitor	T
Jerdon’s Baza	<i>Aviceda jerdoni</i> *	carnivore (incl. piscivore)	upper canopy	uncommon (in NSP sites), resident	L, S, RK
Black Baza	<i>Aviceda leuphotes</i> *	carnivore (incl. piscivore)	upper canopy	fairly common, resident	L, S, RK, T
Oriental Honey-buzzard	<i>Pernis ptilorhynchus</i>	insectivore (while feeding honey-comb)	middle canopy	fairly common, resident	winter visitor
Black-shouldered Kite	<i>Elonus coeruleus</i>	insectivore	ground	fairly common, resident	C, T, RK

Species		Principal diet	Principal foraging guild	Status	Distribution
Black Kite	<i>Milvus migrans</i>	carnivore (incl. piscivore)	ground	fairly common, resident	C, T, RK, S
Brahminy Kite	<i>Haliastur indus</i>	carnivore (incl. piscivore)	ground	common, resident	WI
White-rumped Vulture	<i>Gyps bengalensis</i>	carnivore (incl. piscivore) (carriion)	ground	fairly common, resident	RK, C, T
Himalayan Griffon	<i>Gyps himoloyensis</i>	carnivore (incl. piscivore) (carriion)	ground	uncommon (in NSP sites), vagrant (in Bangladesh)	RK
Crested Serpent Eagle	<i>Spilarnis cheelo*</i>	carnivore (incl. piscivore)	middle canopy	very common, resident	WI
Shikra	<i>Accipiter badius*</i>	carnivore (incl. piscivore)	middle canopy	fairly common, resident	WI
Besra	<i>Accipiter virgotus*</i>	carnivore (incl. piscivore)	middle canopy	fairly common, resident	WI
Changeable Hawk Eagle	<i>Spizaetus cirrhatus*</i>	carnivore (incl. piscivore)	middle canopy	uncommon (in NSP sites), resident	L, S, RK
Common Kestrel	<i>Falca tinnunculus</i>	insectivore	ground	fairly common, winter visitor	WI
Amur Falcon	<i>Folco amurensis</i>	insectivore	upper canopy (mid-air)	uncommon (in NSP sites), winter visitor	L, RK
Little Cormorant	<i>Phalacraxarax niger</i>	carnivore (incl. piscivore)	ground (water)	uncommon (in NSP sites), resident	T
Little Egret	<i>Egretta gorzetta</i>	carnivore (incl. piscivore)	ground	fairly common, resident	C, T, RK
Cattle Egret	<i>Bubulcus ibis</i>	carnivore (incl. piscivore)	ground	fairly common, resident	C, T, RK
Indian Pond Heron	<i>Ardealo grayii</i>	carnivore (incl. piscivore)	ground	very common, resident	C, T, RK, L
Black-crowned Night Heron	<i>Nycticarax nycticarax</i>	carnivore (incl. piscivore)	ground	uncommon (in NSP sites), resident	RK, C, T
Malayan Night Heron	<i>Gorsachius melanalaphus*</i>	carnivore (incl. piscivore)	ground	uncommon (in NSP sites), vagrant (in Bangladesh)	L, RK
Yellow Bittern	<i>Ixabrychus sinensis</i>	carnivore (incl. piscivore)	ground	uncommon (in NSP sites), resident	T, C
Cinnamon Bittern	<i>Ixabrychus cinnamameus</i>	carnivore (incl. piscivore)	ground	fairly common, resident	RK, C, T
Asian Openbill	<i>Anastamus ascitans</i>	carnivore (incl. piscivore) (snail)	ground	uncommon (in NSP sites), resident	RK
Lesser Adjutant	<i>Leptoptilos jovonicus</i>	carnivore (incl. piscivore)	ground	uncommon (in NSP sites), resident	RK
Blue-naped Pitta	<i>Pitta nipalensis*</i>	insectivore	ground	uncommon (in NSP sites), resident	RK, L, S, T
Hooded Pitta	<i>Pitta sardida*</i>	insectivore	ground	uncommon (in NSP sites), summer visitor	S, L, RK
Asian Fairy Bluebird	<i>Irena puello*</i>	frugivore	middle canopy	common, resident	L, S, RK, T
Blue-winged Leafbird	<i>Chlarapsis cachinchinensis*</i>	insectivore	middle canopy	uncommon (in NSP sites), resident	L, T
Golden-fronted Leafbird	<i>Chlarapsis aurifrans*</i>	insectivore	middle canopy	very common, resident	WI
Brown Shrike	<i>Lanius cristatus</i>	insectivore	bush and undergrowth	common, winter visitor	WI
Long-tailed Shrike	<i>Lanius schoch</i>	insectivore	bush and undergrowth	common, resident	WI
Grey-backed Shrike	<i>Lonius tephronotus</i>	insectivore	bush and undergrowth	fairly common, winter visitor	WI
Common Green Magpie	<i>Cissa chinensis*</i>	omnivore	middle canopy	uncommon (in NSP sites), resident	S, L, T
Rufous Treepie	<i>Dendracitta vagabunda</i>	omnivore	middle canopy	common, resident	WI
Grey Treepie	<i>Dendracitta farmosae*</i>	omnivore	middle canopy	fairly common, resident	L, S, RK, T
House Crow	<i>Carvus splendens</i>	omnivore	ground	fairly common, resident	C, T, RK
Large-billed Crow	<i>Carvus macrarhynchus</i>	omnivore	ground	common, resident	WI
Ashy Woodswallow	<i>Artamus fuscus</i>	insectivore	upper canopy (mid-air)	fairly common, resident	WI
Black-naped Oriole	<i>Orialus chinensis*</i>	omnivore	middle canopy	uncommon (in NSP sites), winter visitor	L, S, RK
Black-hooded Oriole	<i>Oriolus xanthornus</i>	omnivore	middle canopy	very common, resident	WI
Maroon Oriole	<i>Orialus traillii*</i>	omnivore	upper canopy	uncommon (in NSP sites), resident	L, S, RK
Large Cuckooshrike	<i>Carocino mocei</i>	omnivore	middle canopy	common, resident	WI
Black-winged Cuckooshrike	<i>Caracina melaschistos*</i>	omnivore	middle canopy	uncommon (in NSP sites), winter visitor	L, S, RK
Black-headed Cuckooshrike	<i>Carocino melonaptero</i>	omnivore	middle canopy	uncommon (in NSP sites), resident	RK
Rosy Minivet	<i>Pericracatus raseus*</i>	insectivore	upper canopy	uncommon (in NSP sites), resident	L, S, RK
Ashy Minivet	<i>Pericracatus divaricatus*</i>	insectivore	upper canopy	uncommon (in NSP sites), resident	L, RK
Small Minivet	<i>Pericrocatus cinnamameus*</i>	insectivore	upper canopy	very common, resident	WI
Scarlet Minivet	<i>Pericracatus flammeus*</i>	insectivore	upper canopy	common, resident	WI
Bar-winged Flycatcher-shrike	<i>Hemipus picatus*</i>	insectivore	middle canopy	fairly common, resident	L, S, RK
White-throated Fantail	<i>Rhipidura albicollis</i>	insectivore	bush and undergrowth	common, resident	WI
Black Drongo	<i>Dicrurus macrocercus</i>	insectivore	middle canopy	very common, resident	WI
Ashy Drongo	<i>Dicrurus leucophaeus</i>	insectivore	middle canopy	uncommon (in NSP sites), winter visitor	WI
Bronzed Drongo	<i>Dicrurus oeneus*</i>	insectivore	middle canopy	very common, resident	WI

Species		Principal diet	Principal foraging guild	Status	Distribution
Lesser Racket-tailed Drongo	<i>Dicrurus remifer</i> *	insectivore	upper canopy	uncommon (in NSP sites), winter visitor	L, S, RK
Spangled Drongo	<i>Dicrurus hottentottus</i> *	insectivore	middle canopy	common, resident	WI
Greater Racket-tailed Drongo	<i>Dicrurus paradiseus</i> *	insectivore	upper canopy	common, resident	WI
Black-naped Monarch	<i>Hypothymis azurea</i> *	insectivore	bush and undergrowth	common, resident	WI
Common Iora	<i>Aegithina tiphia</i>	insectivore	middle canopy	very common, resident	WI
Large Woodshrike	<i>Tephrodornis gularis</i> *	insectivore	upper canopy	common, resident	L, S, RK
Common Woodshrike	<i>Tephrodornis pondicerianus</i> *	insectivore	middle canopy	common, resident	WI
Blue Rock Thrush	<i>Monticola solitarius</i>	insectivore	ground	fairly common, winter visitor	WI
Blue Whistling Thrush	<i>Myophonus caeruleus</i> *	insectivore	ground	uncommon (in NSP sites), resident	T
Orange-headed Thrush	<i>Zoothero citrino</i>	insectivore	ground	uncommon (in NSP sites), resident	WI
Red-throated Flycatcher	<i>Ficedula parva</i>	insectivore	middle canopy	very common, winter visitor	WI
Verditer Flycatcher	<i>Eumyias thalassina</i> *	insectivore	upper canopy	fairly common, winter visitor	WI
Pale-chinned Flycatcher	<i>Cyornis poliagenys</i> *	insectivore	middle canopy	uncommon (in NSP sites), resident	RK, L, S
Grey-headed Canary Flycatcher	<i>Culicicopo ceylonensis</i>	insectivore	middle canopy	common, resident	WI
Oriental Magpie Robin	<i>Copsychus saularis</i>	insectivore	ground	very common, resident	WI
White-rumped Shama	<i>Copsychus malabaricus</i> *	insectivore	ground	common, resident	WI
Black Redstart	<i>Phoenicurus ochruros</i>	insectivore	bush and undergrowth	uncommon (in NSP sites), winter visitor	RK, C, T
Black-backed Forktail	<i>Enicurus immaculatus</i> *	insectivore	ground	uncommon (in NSP sites), resident	RK, T
Common Stonechat	<i>Saxicala torquata</i>	insectivore	bush and undergrowth	common, winter visitor	RK, C, T
Pied Bushchat	<i>Saxicala caprata</i>	insectivore	bush and undergrowth	uncommon (in NSP sites), resident	C, T
Asian Glossy Starling	<i>Aplonis ponoyensis</i> *	frugivore	middle canopy	uncommon (in NSP sites), winter visitor	T
Chestnut-tailed Starling	<i>Sturnus moloboricus</i>	frugivore	middle canopy	very common, resident	WI
Asian Pied Starling	<i>Sturnus contra</i>	omnivore	ground	very common, resident	WI
Common Myna	<i>Acridotheres tristis</i>	omnivore	ground	very common, resident	WI
Bank Myna	<i>Acridotheres ginginianus</i>	omnivore	ground	uncommon (in NSP sites), resident	RK, C, T
Jungle Myna	<i>Acridatheres fuscus</i>	omnivore	middle canopy	very common, resident	WI
Hill Myna	<i>Gracula religiosa</i> *	omnivore	upper canopy	common, resident	WI
Velvet-fronted Nuthatch	<i>Sitta frontalis</i> *	insectivore	middle canopy	fairly common, resident	RK, L, S
Great Tit	<i>Parus major</i>	insectivore	middle canopy	very common, resident	WI
Barn Swallow	<i>Hirundo rustica</i>	insectivore	upper canopy (mid-air)	common, winter visitor	WI
Black-headed Bulbul	<i>Pycnanotus atriceps</i> *	omnivore	middle canopy	fairly common, resident	WI
Black-crested Bulbul	<i>Pycnonotus melonicterus</i> *	omnivore	middle canopy	common, resident	WI
Red-whiskered Bulbul	<i>Pycnanatus jacasus</i>	omnivore	middle canopy	very common, resident	WI
Red-vented Bulbul	<i>Pycnonatus cafer</i>	omnivore	middle canopy	very common, resident	WI
White-throated Bulbul	<i>Alophoixus flavealus</i> *	omnivore	middle canopy	common, resident	WI
Olive Bulbul	<i>Iole virescens</i> *	omnivore	middle canopy	uncommon (in NSP sites), resident	RK, L, S
Ashy Bulbul	<i>Hemixos flovala</i> *	omnivore	middle canopy	uncommon (in NSP sites), resident	L, RK
Grey-breasted Prinia	<i>Prinia hodgsonii</i>	insectivore	bush and undergrowth	common, resident	WI
Plain Prinia	<i>Prinia inarnata</i>	insectivore	bush and undergrowth	fairly common, resident	C, T, RK
Zitting Cisticola	<i>Cisticola juncidis</i>	insectivore	bush and undergrowth	common, resident	WI
Oriental White-eye	<i>Zosterops palpebrosus</i>	insectivore	middle canopy	very common, resident	WI
Blyth's Reed Warbler	<i>Acrocepholus dumetarum</i>	insectivore	bush and undergrowth	common, winter visitor	WI
Striated Grassbird	<i>Megalurus polustris</i>	insectivore	bush and undergrowth	fairly common, resident	C, T
Common Tailorbird	<i>Orthotomus sutorius</i>	insectivore	bush and undergrowth	very common, resident	WI
Dark-necked Tailorbird	<i>Orthotomus atrogularis</i> *	insectivore	bush and undergrowth	fairly common, resident	T, C
Dusky Warbler	<i>Phylloscopus fuscatus</i>	insectivore	bush and undergrowth	fairly common, winter visitor	WI
Tickell's Leaf Warbler	<i>Phylloscopus affinis</i>	insectivore	middle canopy	fairly common, winter visitor	WI
Yellow-browed Warbler	<i>Phyllascapus inornatus</i>	insectivore	middle canopy	common, winter visitor	WI
Greenish Warbler	<i>Phylloscopus trochiloides</i>	insectivore	middle canopy	fairly common, winter visitor	WI

Species		Principal diet	Principal foraging guild	Status	Distribution
Blyth's Leaf Warbler	<i>Phyllascapus regulaides</i>	insectivore	middle canopy	fairly common, winter visitor	L, S, RK
Yellow-vented Warbler	<i>Phyllascapus cantatar</i>	insectivore	middle canopy	fairly common, winter visitor	L, RK
Golden-spectacled Warbler	<i>Seicercus burkii</i>	insectivore	middle canopy	uncommon (in NSP sites), summer visitor	L, RK
Grey-hooded Warbler	<i>Seicercus xanthaschistas</i>	insectivore	middle canopy	uncommon (in NSP sites), winter visitor	L, RK
White-crested Laughingthrush	<i>Garrulax leucalaphus*</i>	insectivore	bush and undergrowth	uncommon (in NSP sites), resident	C, T
Lesser Necklaced Laughingthrush	<i>Garrulax maniliger*</i>	insectivore	middle canopy	uncommon (in NSP sites), resident	RK, L, C
Greater Necklaced Laughingthrush	<i>Garrulax pectoralis*</i>	insectivore	middle canopy	common, resident	WI
Rufous-necked Laughingthrush	<i>Garrulax ruficallis*</i>	insectivore	bush and undergrowth	common, resident	WI
Abbott's Babbler	<i>Malacacinclea abbatti*</i>	insectivore	bush and undergrowth	very common, resident	WI
Puff-throated Babbler	<i>Pellarneau ruficeps*</i>	insectivore	bush and undergrowth	common, resident	WI
Large Scimitar Babbler	<i>Pamatarhinus hypaleucas*</i>	insectivore	middle canopy	uncommon (in NSP sites), resident	L, RK, T
White-browed Scimitar Babbler	<i>Pamatarhinus schisticeps*</i>	insectivore	bush and undergrowth	uncommon (in NSP sites), resident	L, S, RK
Grey-throated Babbler	<i>Stachyris nigriceps*</i>	insectivore	bush and undergrowth	uncommon (in NSP sites), resident	C, T
Striped Tit Babbler	<i>Macranas gularis*</i>	insectivore	bush and undergrowth	common, resident	WI
Chestnut-capped Babbler	<i>Timalia pileata*</i>	insectivore	bush and undergrowth	uncommon (in NSP sites), resident	C, T
Yellow-eyed Babbler	<i>Chrysamma sinensis*</i>	insectivore	bush and undergrowth	uncommon (in NSP sites), resident	C, T
Brown-cheeked Fulvetta	<i>Alcippe paiaicephala*</i>	insectivore	middle canopy	uncommon (in NSP sites), resident	L
Nepal Fulvetta	<i>Alcippe nipalensis*</i>	insectivore	middle canopy	uncommon (in NSP sites), resident	RK
Rufous-winged Bushlark	<i>Mirafra assamica</i>	granivore and herbivore	ground	common, resident	WI
Thick-billed Flowerpecker	<i>Dicaeum agile</i>	omnivore	middle canopy	fairly common, resident	RK, C, T
Yellow-vented Flowerpecker	<i>Dicaeum chrysarrheum*</i>	omnivore	middle canopy	uncommon (in NSP sites), resident	L, RK, T
Orange-bellied Flowerpecker	<i>Dicaeum triganastigma*</i>	omnivore	middle canopy	uncommon (in NSP sites), resident	T
Pale-billed Flowerpecker	<i>Dicaeum erythrorynchas</i>	omnivore	middle canopy	common, resident	WI
Plain Flowerpecker	<i>Dicaeum cancalar</i>	omnivore	middle canopy	common, resident	L, RK, T
Scarlet-backed Flowerpecker	<i>Dicaeum cruentatum*</i>	omnivore	middle canopy	very common, resident	WI
Ruby-cheeked Sunbird	<i>Anthreptes singalensis*</i>	nectarivore	middle canopy	fairly common, resident	WI
Purple-rumped Sunbird	<i>Nectarinia zeylanica</i>	nectarivore	middle canopy	fairly common, resident	RK, L, C, T
Purple-throated Sunbird	<i>Nectarinia sperata*</i>	nectarivore	middle canopy	common, resident	WI
Purple Sunbird	<i>Nectarinia asiatica</i>	nectarivore	middle canopy	very common, resident	WI
Crimson Sunbird	<i>Aethapya siparaja*</i>	nectarivore	middle canopy	very common, resident	WI
Little Spiderhunter	<i>Arachnathera langirastra*</i>	nectarivore	middle canopy	very common, resident	WI
Streaked Spiderhunter	<i>Arachnathera magna*</i>	nectarivore	middle canopy	uncommon (in NSP sites), resident	T
House Sparrow	<i>Passer domesticus</i>	granivore and herbivore	ground	common, resident	WI
Forest Wagtail	<i>Dendrananthus indicus*</i>	insectivore	ground	common, winter visitor	WI
White Wagtail	<i>Matacilla alba</i>	insectivore	ground	common, winter visitor	RK, L, C, T
White-browed Wagtail	<i>Matacilla maderaspatensis</i>	insectivore	ground	common, resident	RK, L, C, T
Citrine Wagtail	<i>Matacilla citreala</i>	insectivore	ground	uncommon (in NSP sites), winter visitor	RK, C, T
Grey Wagtail	<i>Matacilla cinerea</i>	insectivore	ground	fairly common, winter visitor	RK, C, T
Paddyfield Pipit	<i>Anthus ruficallis</i>	insectivore	ground	common, resident	RK, C, T
Olive-backed Pipit	<i>Anthus hadgsani*</i>	insectivore	ground	common, winter visitor	WI
Rosy Pipit	<i>Anthus raseatus</i>	insectivore	ground	uncommon (in NSP sites), winter visitor	RK
Baya Weaver	<i>Placeus philippinus</i>	insectivore	ground	common, resident	WI
Indian Silverbill	<i>Lanchura malabarica</i>	granivore and herbivore	ground	uncommon (in NSP sites), resident	RK, C, T
White-rumped Munia	<i>Lanchura striata*</i>	granivore and herbivore	ground	fairly common, resident	WI
Scaly-breasted Munia	<i>Lanchura punctulata</i>	granivore and herbivore	ground	common, resident	RK, C, T
Black-headed Munia	<i>Lanchura malacca</i>	granivore and herbivore	ground	uncommon (in NSP sites), resident	RK, C, T